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December 23, 1997

Ms. Magalie Roman Salas
Secretary
Federal Communications Commission
1919 M. St., NW, Room 222
Washington, D.C. 20554

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FEDERAL COMMUNICATIONS COMMISSION
OFFICE OF THE SECRETARY

> RE: <u>Ex Parte Presentation – Proxy Cost Models</u>
> CC Docket No. 96-45

Dear Ms. Salas:

On December 23, 1997, AT&T and MCI (the Hatfield Model Sponsors or "HMS") met with Brian Clopton, Chuck Keller, Bob Loube, Richard Smith and Natalie Wales of the Universal Service Branch of the Common Carrier Bureau in regards to the staff's examination of cost models for universal service in CC Docket Nos. 96-45 and 97-160. The HMS were represented by Richard Clarke and Mike Lieberman of AT&T, Chris Frentrup of MCI, Chris Antis of PNR, and Brian Pitkin of Klick, Kent and Allen.

There were three purposes to this meeting. The first was to provide some additional description of the state-of-the-art customer counting, locating and clustering algorithms incorporated into the Hatfield Model, v5.0 ("HM 5.0"). The second was to correct several erroneous statements about the HM 5.0's data set that were made by the BCPM Sponsors (BellSouth, Sprint and U.S. West) in their December 11, 1997 submission of the BCPM3 to the Commission. The most significant of the BCPM Sponsors' erroneous statements was that the Metromail residential database used by HM 5.0 contains only 74.4 million records covering 69% of customer locations. As the attached letter from Metromail indicates, their database contains 98.2 million records covering over 90% of all customer locations. The HMS have been unable to determine where the BCPM Sponsors might have secured their inaccurate data.

The final purpose of the meeting was to provide the Commission staff with a comprehensive evaluation of the performance of the HM 5.0 vis à vis the BCPM3 at counting, locating and clustering telephone customers. This analysis demonstrates that in every significant regard, the HM 5.0 does a superior job at each of these vital tasks. In particular, the ultimate facts are these.

1) The BCPM3 truly locates no customers below the CB level.
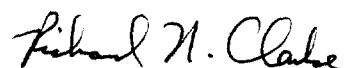
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2) The BCPM3 Sponsors' assertions that their model's purported identification of customers as uniformly distributed along a CB's road network is:

- An assertion that the BCPM Sponsors proffer without evidentiary support;

- An assertion that is demonstrated to be false by the only comprehensive data that could be dispositive on the issue: actual customer geocode data.

3) The BCPM3's artifice of declaring that "clusters" of customers exist only within even 1/25th of a degree latitude and longitude meridians is:

- Without regard to significant telephone plant engineering principles;

- Is revealed to be incorrect by actual customer geocode data;

- Will result in BCPM3-modeled costs that exceed significantly those of efficiently engineered carrier serving areas.

4) The locations where the BCPM3 places its modeled distribution areas and DLC remote terminals are locations where there may be neither customers, nor roads.

5) The amounts of distribution cable deployed by the BCPM3 are inconsistent with the BCPM3's other assumptions about customer location and lot configuration.

As a result of these and numerous other flaws that appear to be intrinsic to the BCPM3's basic structure, the data set that the BCPM3 develops cannot be relied on to portray accurately counts, locations and clusters of customers – data that are needed to model an efficient local telephone network. In a subsequent presentation, the HMS will demonstrate that not only is the BCPM input data set severely flawed, but its methodologies for engineering the local network are inconsistent with the Commission's requirements for a model of universal service costs.

Two copies of this Notice are being submitted to the Secretary of the FCC in accordance with Section 1.1206(a)(2) of the Commission's rules.

Sincerely,

Richard N. Clarke

Richard N. Clarke

Attachments

cc: Sheryl Todd   Natalie Wales
    Brian Clopton   Brad Wimmer
    Chuck Keller   Mark Kennet
    Bob Loube   William Sharkey
    Richard Smith   Anthony Bush

/// M E T R O M A I L

Date: December 19, 1997

To: Ron Lindsay   cc: Glenn Hudock

From: Kevin Wiese

Subject: Emerson and Associates' Metromail findings.

After reviewing the document prepared by Emerson and Associates to compare
data sources utilized for their Benchmark Cost Planning Model(BCPM) and
Hatfield Cost Planning Model (Hatfield 5.0); it is apparent that some inaccurate
statements have been made concerning Metromail's National Consumer
Database (NCDB). I would like to clarify some of the following statements:
*(Please note, further investigation is being pursued in relation to other
statements made about the NCDB.)*

Statement: *As of December 5, 1997, the Metromail database contained 74.4
million named and unnamed address records for the 50 states.*

Fact: As of December 19, 1997, the Metromail database contains 98.2 million
named and unnamed households.

Statement: Hence, the Metromail database contains only 69% of the potential
addresses.....The Hatfield documentation for Preliminary Release 5.0 claims that
the Metromail database includes 90% of the 1995 Census count.

Fact: The Metromail database does have over 90% (approximately 91.5%) of the
residential addresses in the U.S.

Further, address counts listed within the document are under represented at the
state and county level (see attachments). Investigation is being made into other
geo coverage statements and will be forthcoming.

If you need any other clarifications, please feel free to call me at 402-473-4866.
Thanks. Have a happy holiday.

Table 1. Metromail Address Counts for the 50 States.

State	1990 Census Housing Units	Metromail Households	Metromail Percent of Amount	Total including '1+0's'	Ghost+
AL				1386 470	150 375
AK				1-14211	14.458
AZ				1347 711	173. 17b
AR				830223	87, 55:
CA				-1 85 585	1 395. 446
CO				1347 224	142360
CT				1168 932	122 050
DE				264,231	28 525
DC				209161	15 621
FL				5653.754	735914
GA				2287 312	278 255 GA
HI				-304 63	20 363
ID				-418 34	40 471
IL				3554 473	434 057
IN				1900 030	245.429
IA				1021 686	102 299
KS				891, 427	118 264
KY				1283984	130.273
LA				1393086	152090
ME				530 664	33,450
MD				1754 506	177 913
MA				2155 236	199 829
MI				3149199	435082
MN				1759359	125 913
MS				896 236	83 303
MO				1858 860	219 226
MT				321 241	27904
NE				581 814	55134
NV				573 107	72.806
NH				466.956	33428
NJ				2591.011	301.827
NM				325.756	58.691
NY				5639.984	435.793
NC				2432 001	250.471
ND				247.616	16.517
OH				3664.993	484.049
OK				1116966	146.695
OR				1239 456	149.393
PA				4240 246	443.728
RI				333.712	39.166
SC				1182597	135.976
SD				266.399	16.531
TN				1806.961	208.308
TX				5782.967	693.606
UT				590.743	62.364
VT				263.972	7.871
VA				2262.145	212.520
WA				1906.434	215.306
WV				643.651	44.960
WI				346.743	17.984
WY				167.336	17.214
Total	107,978,335	74,498,948	69.97%	88,363,916	9.708,234
Maximum			85.42%		
Minimum			27.95%		

Grand Total
98,272,150

*Not in
in tot

3

An indication of the shortcoming of the Metromail database in the rural sense is given by Table 2. Table 2 shows the Census housing unit counts and Metromail household address counts for eight rural counties, two from each state of Montana, North Carolina, North Dakota, and Utah. The wide variation in the Metromail "shares" is striking, both inter- and intrastate. In Montana, for example, Metromail has potential addresses for only 7.3 % of the housing units in Meagher County. In Rosebud County, the hit rate is higher but is still only 30.9 %.

Again, these addresses include many that cannot be accurately geocoded (i.e., P.O. Boxes and Rural Routes). Hence, the geocodable hit rate in rural counties is even smaller than that shown in Table 2. Of the 1,348 Metromail addresses for Rosebud County, for example, 567 or 42 % are P.O. Boxes or Rural Routes. Hence, the true share of only 18 % of the Census housing units is located in Rosebud County, 571 can be geocoded to the level of accuracy used by the Bayfield Model techniques. In other words, 12 % of the housing units in Rosebud County are subject to the Bayfield Model's "average" algorithm, which simply distributes available housing units to the perimeter of the Census Block.

Table 2. Metromail Address Counts for Eight Rural Counties

County	State	Metromail Household Address Count	Census Housing Unit Count	Percent	Count
Meagher					719
Rosebud				30.9%	2,605
Halifax					10,083
Wilkes					20,858
Larson					2,105
Stark					9,732
Sanpete					4,845
Wasatch					10,963

Geocoding

To determine the level of accuracy of the Bayfield geocoding the Joint Sponsors acquired from Metromail their addresses for the Albany and Vienna wiresenters. The Joint Sponsors also acquired from GDT the necessary street data for the geocoding process and from QuikStreet's Marketing Software, the Census Do-loop geocoding software. Both GDT and Census were used in the Bayfield geocoding methodology. The Joint Sponsors followed, as closely as the limited Bayfield documentation permits, the Bayfield geocoding methodology.

Table 3 shows the Census and Metromail outputs for these two wiresenters. Also shown are the shares of Census housing units that can be geocoded. For the Albany wiresenter, the Metromail address count is only 53.5 % of the Census housing unit count. When this address count is geocoded or removed, the Metromail address count falls to 16.3 % of the Census housing unit count. The geocode hit rate is higher in the

Vernon wirecenter, although still only two-thirds of the Census housing units can be spatially located.

Table 3. Microwaved Address Counts for the Albany and Vernon Texas Wirecenters.

	ZIP					
	74450					
	76384					996 5031

The aggregate statistics shown in Table 3 hide the substantial differences in the goodness of fit that exist between the urban and rural portions of these wirecenters. An appreciation of these differences can be obtained by inspecting maps of the wirecenters. These maps show the customer locations that can be geocoded using the Microwaved and GDT data. They also show the actual locations of housing units. In the case of the Albany wirecenter, actual housing unit locations were obtained through the use of satellite photography. These observations were augmented by Southwestern Bell data so that 100 % of housing unit locations are shown. Southwestern Bell does not have GPS data for the Vernon wirecenter so only satellite observations are shown. Satellite observations are limited to the non-urban areas of the Vernon wirecenter where a high percentage of the existing housing units could be identified in satellite photographs.

Figure 1 shows the Albany wirecenter and Figure 2 shows the Vernon wirecenter. Geocoded housing units are indicated by a dark diamond while actual housing units are shown by a lightly shaded circle. What is immediately apparent is that most of the geocoded housing units are in the cities of Albany and Vernon, and in the rural areas of the wirecenter. Even in the Vernon wirecenter, where 66.7 % of the Census housing units can be spatially located, the bulk of the geocoded locations are in the urban area.

The Albany and Vernon wirecenters clearly highlight the fact that customer locations in the rural areas cannot be accurately located using geocoding. Substantial enhancements to the household address database need to occur before geocoding is a viable option for locating telephone customers in rural areas.

The Hatfield 5.0 Customer Location Algorithm

The fact that the geocode rates in rural areas are low has a profound implication for the Hatfield 5.0 customer location algorithm. It essentially reduces the algorithm to an arbitrary determination of customer location, much like that of version 4.0.

According to the Hatfield Model Preliminary Release 5.0 documentation and presentation made at a NARUC in November of 1997, the Hatfield model arbitrarily places housing units that cannot be geocoded on the perimeter of the Census Block in

[footnote] Southwestern Bell determined actual customer location through the use of Global Positioning Satellite (GPS) technology.

GEOCODE SUCCESS IN HM 5.0 METROMAIL DATA

State	Total MM Records	Coded	Not Coded	Percent Geocoded
AL	1,545,881	1,037,888	507,993	67%
AK	206,077	77,572	128,505	38%
AZ	1,550,174	1,270,551	279,623	82%
AR	919,008	517,499	401,509	56%
CA	11,414,176	7,495,017	3,919,159	66%
CO	1,537,053	1,262,890	274,163	82%
CT	1,302,020	1,180,136	121,884	91%
DE	292,400	207,468	84,932	71%
DC	237,283	216,419	20,864	91%
FL	6,463,507	4,253,768	2,209,739	66%
GA	2,574,076	1,929,642	644,434	75%
HI	319,746	230,672	89,074	72%
ID	459,866	278,944	180,922	61%
IL	3,968,590	3,198,193	770,397	81%
IN	2,154,584	1,516,597	637,987	70%
IA	1,135,534	750,424	385,110	66%
KS	1,028,924	643,968	384,956	63%
KY	1,417,444	960,881	456,563	68%
LA	1,543,749	1,173,401	370,348	76%
ME	567,903	239,836	328,067	42%
MD	1,905,984	1,584,479	321,505	83%
MA	2,387,805	2,113,051	274,754	88%
MI	3,600,779	2,887,416	713,363	80%
MN	1,926,148	1,445,467	480,681	75%
MS	906,374	500,818	405,556	55%
MO	2,101,194	1,390,724	710,470	66%
MT	351,530	206,816	144,714	59%
NE	645,761	419,602	226,159	65%
NV	662,679	448,938	213,741	68%
NH	493,636	287,998	205,638	58%
NJ	2,882,822	2,494,729	388,093	87%
NM	580,108	384,813	195,295	66%
NY	6,217,734	5,035,303	1,182,431	81%
NC	2,684,925	1,719,598	965,327	64%
ND	272,460	170,921	101,539	63%
OH	4,165,880	3,565,837	600,043	86%
OK	1,286,808	665,426	621,382	52%
OR	1,374,149	504,475	869,674	37%
PA	4,765,962	3,490,647	1,275,315	73%
RI	376,845	341,532	35,313	91%
SC	1,327,018	970,715	356,303	73%
SD	283,608	149,544	134,064	53%
TN	2,058,816	1,498,383	560,433	73%
TX	6,410,218	4,903,790	1,506,428	76%
UT	647,631	470,992	176,639	73%
VT	268,329	78,370	189,959	29%
VA	2,447,591	1,740,865	706,726	71%
WA	2,141,265	1,279,500	861,765	60%
WV	698,056	304,841	393,215	44%
WI	2,072,126	1,526,473	545,653	74%
WY	188,115	122,596	65,519	65%
Total	98,770,351	71,146,425	27,623,926	72%

Figure 1

Maryland Wire Center
CAMBRIDGE

1990 Census Block
1994 Tiger Streets
1997 Point Data

Business Points
Residential Points

Figure 2

Maryland Wire Center
CV--MDSE

1990 Census Blo...
1994 ...per Streets
1997 ...Point Dat...

Business Points
Business Surrogates
Residential Points
Residential Surrogates

Figure 3

Maryland Wire Center
CLVLMDCE

—— 1990 Census Blocks
━━ 1994 Tiger Road Files
1997 Actual Point Locations

Residential Points
Business Points
Surrogate Points

0   0.25   0.5
Miles

Figure 4

Maryland Wire Center
CLVLMDCE

Actual point Close-up

Figure 5

MD Wire Center
PLVLMDPV

Business Points
Business Surrogates
Residential Points
Residential Surrogates

0   3   6
Miles

Figure 6

Maryland Wire Center
PLVLMDPV
Close up actual points only

Figure 7

**MD Wire Center
PLVLMDPV**

Business Points
Residential Points

Miles

0   3   6
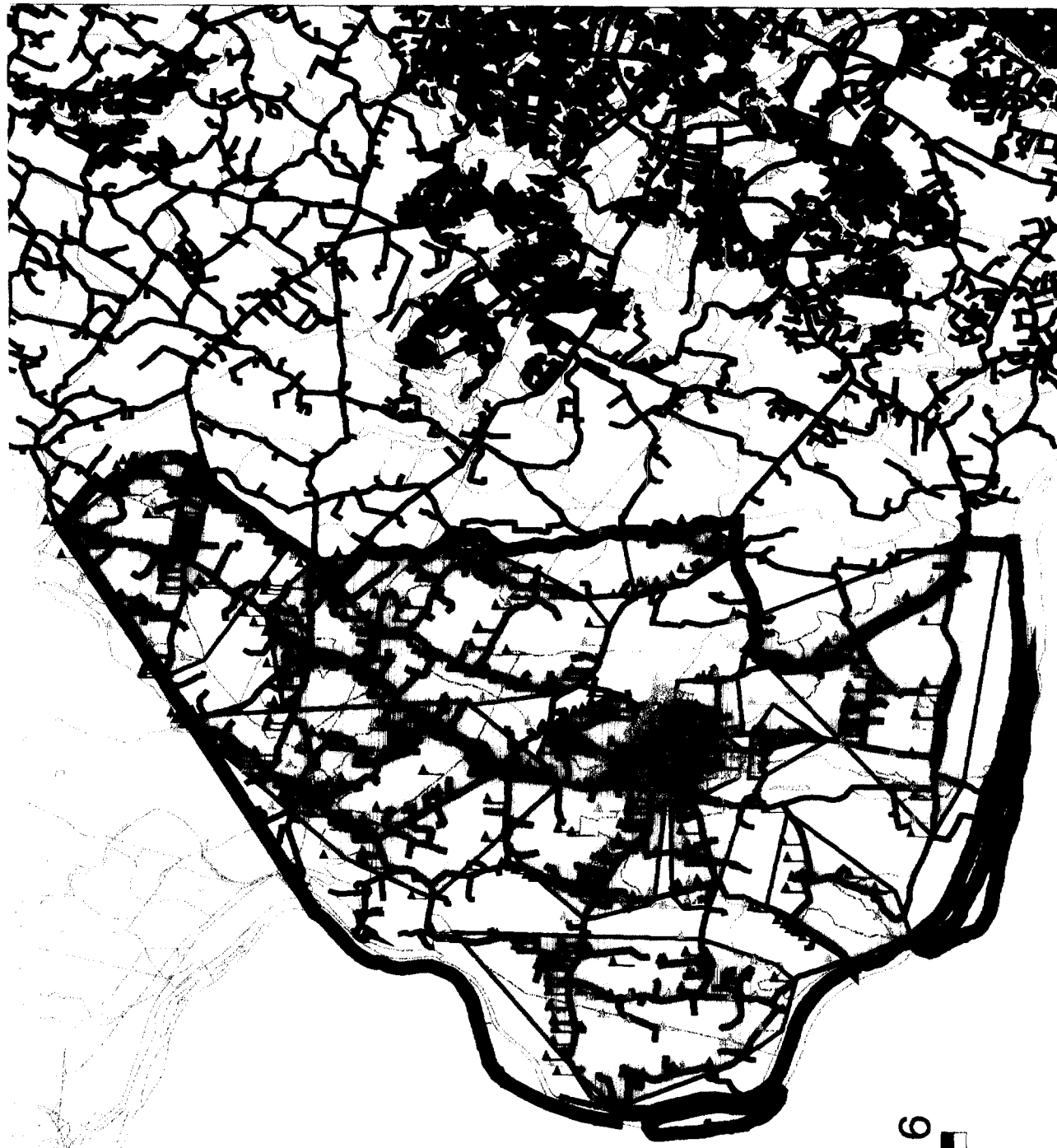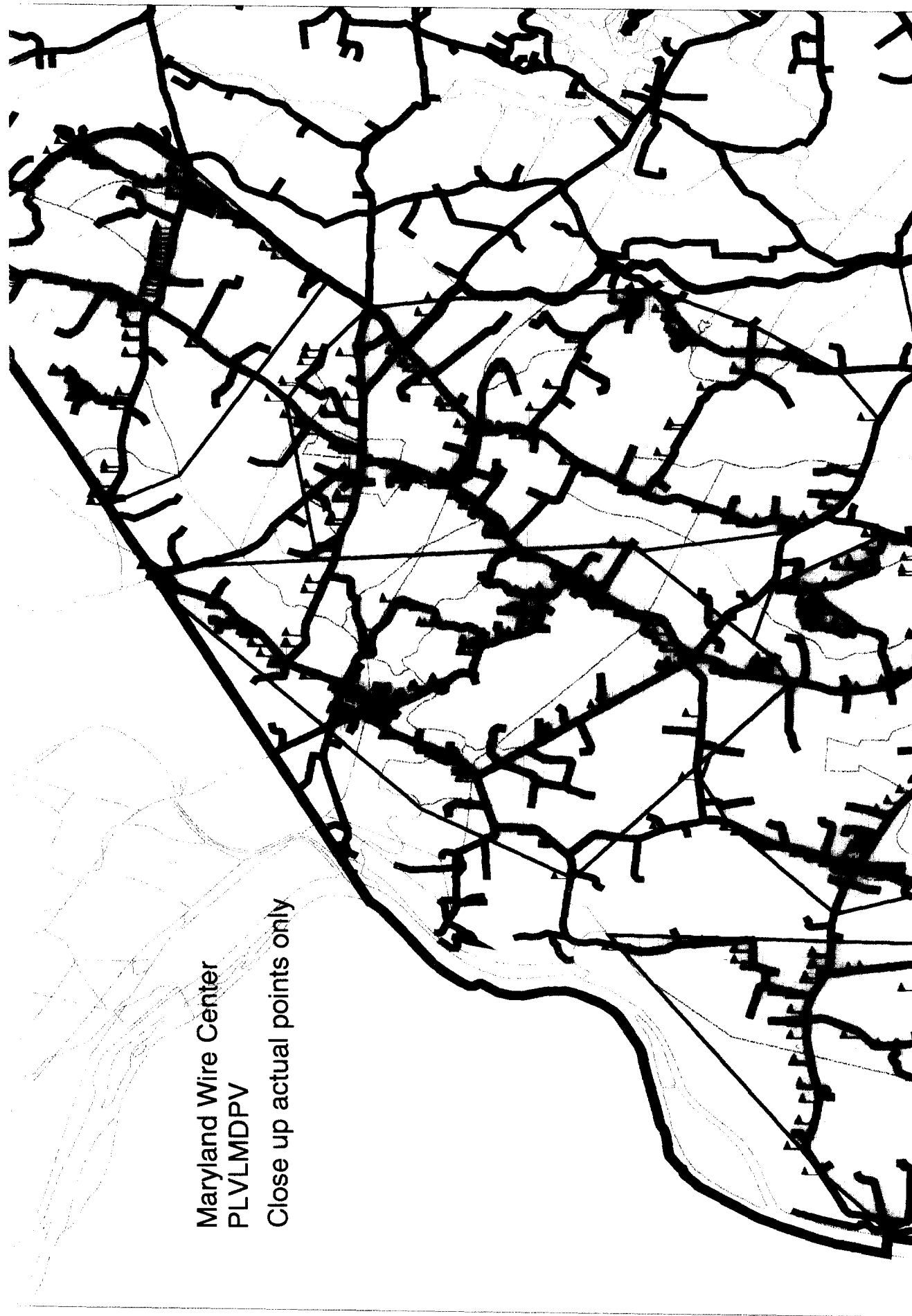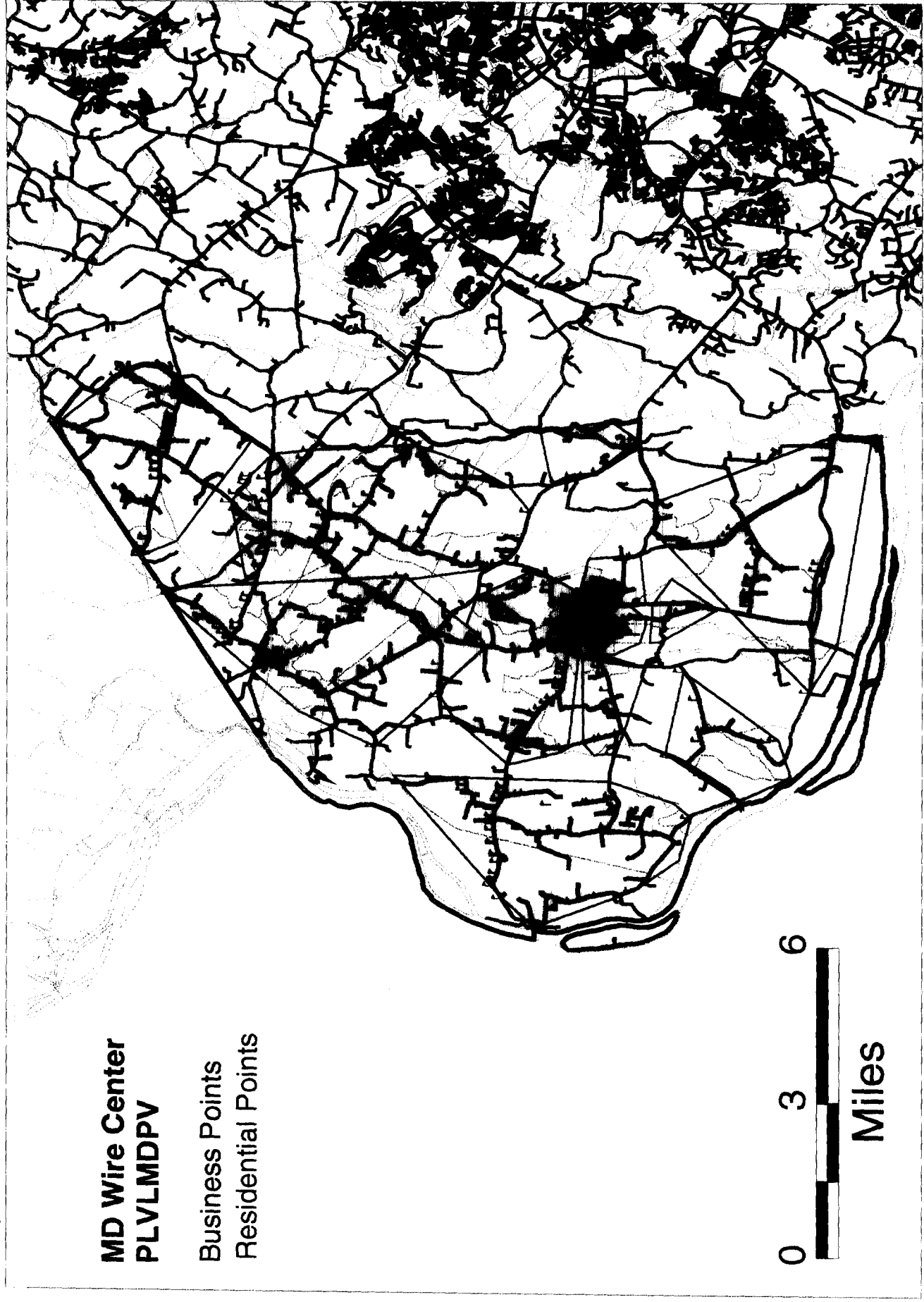
Figure 8

BCPM 2
12,000 Feet by 14,000 Feet
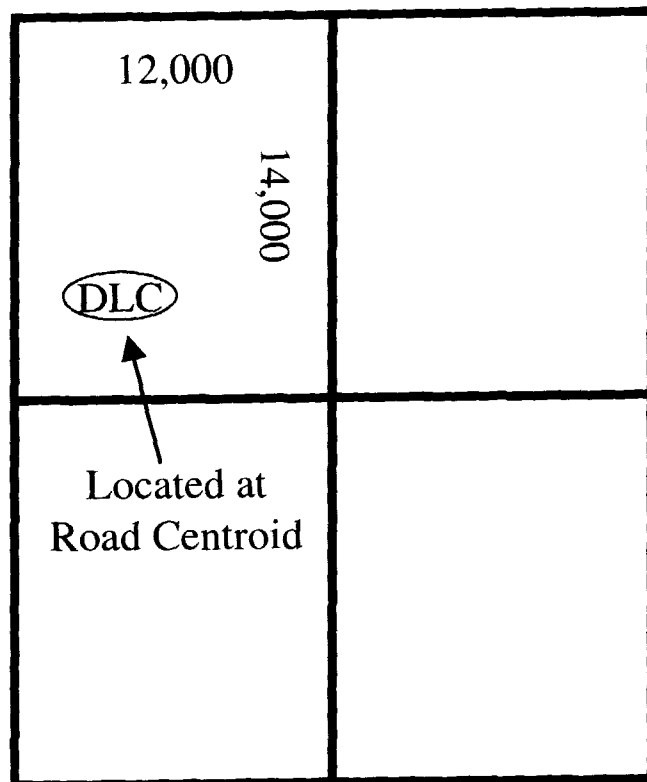
More Efficient Design
18,000 Feet by 18,000 Feet

18,000

18,000

DLC

Located at
Geographic Centroid

12,000

14,000

DLC

Located at
Road Centroid
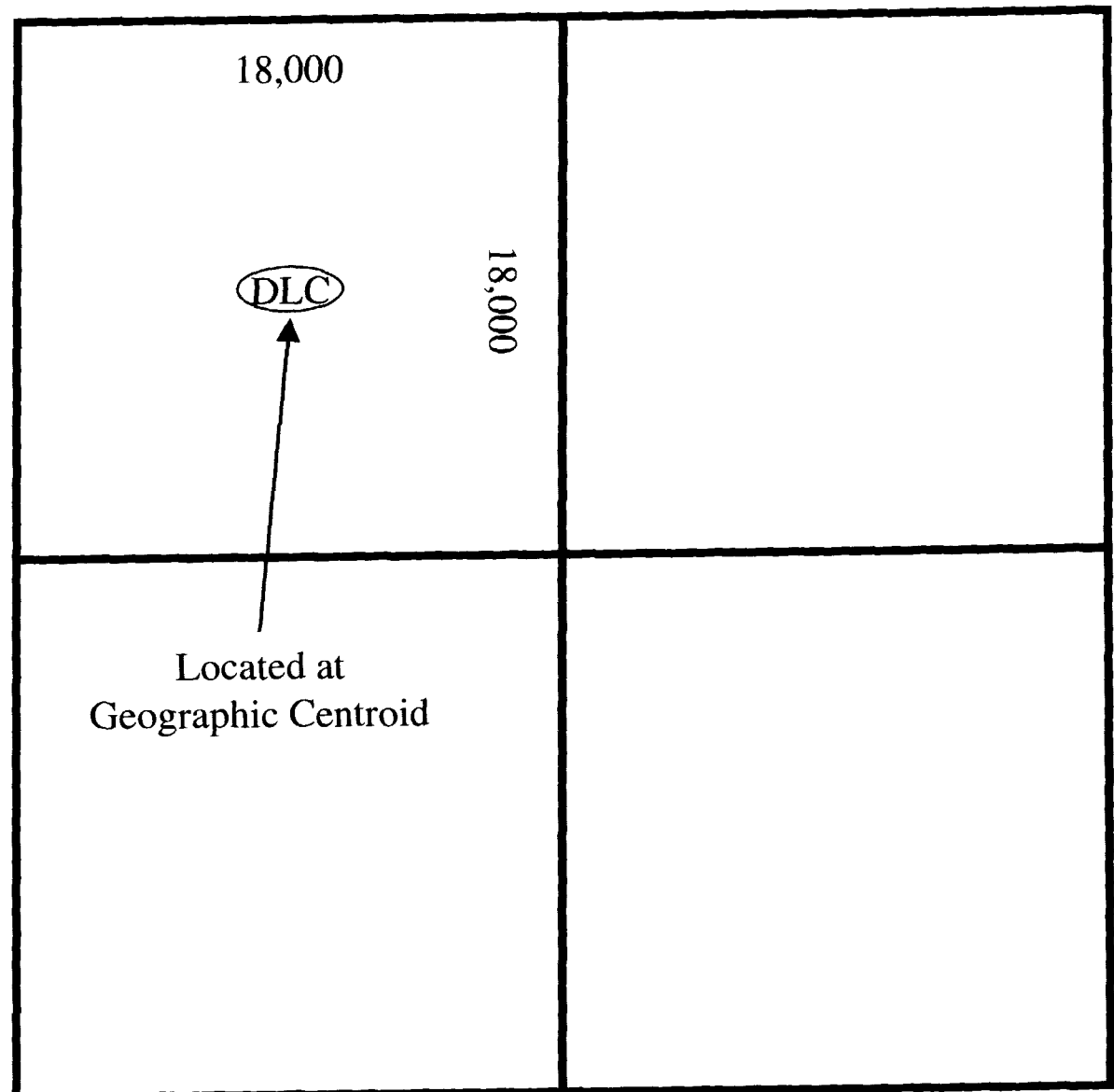
Figure 9

BCPM Methodology Can Have Over 18,000 Feet of Copper

$$9,000$$
$$+\ 11,000$$
$$20,000$$

Rural Road

11,000 Feet

14,000 Feet

"Road" Centroid

9,000 Feet

DLC

Suburban Neighborhood

12,000 Feet
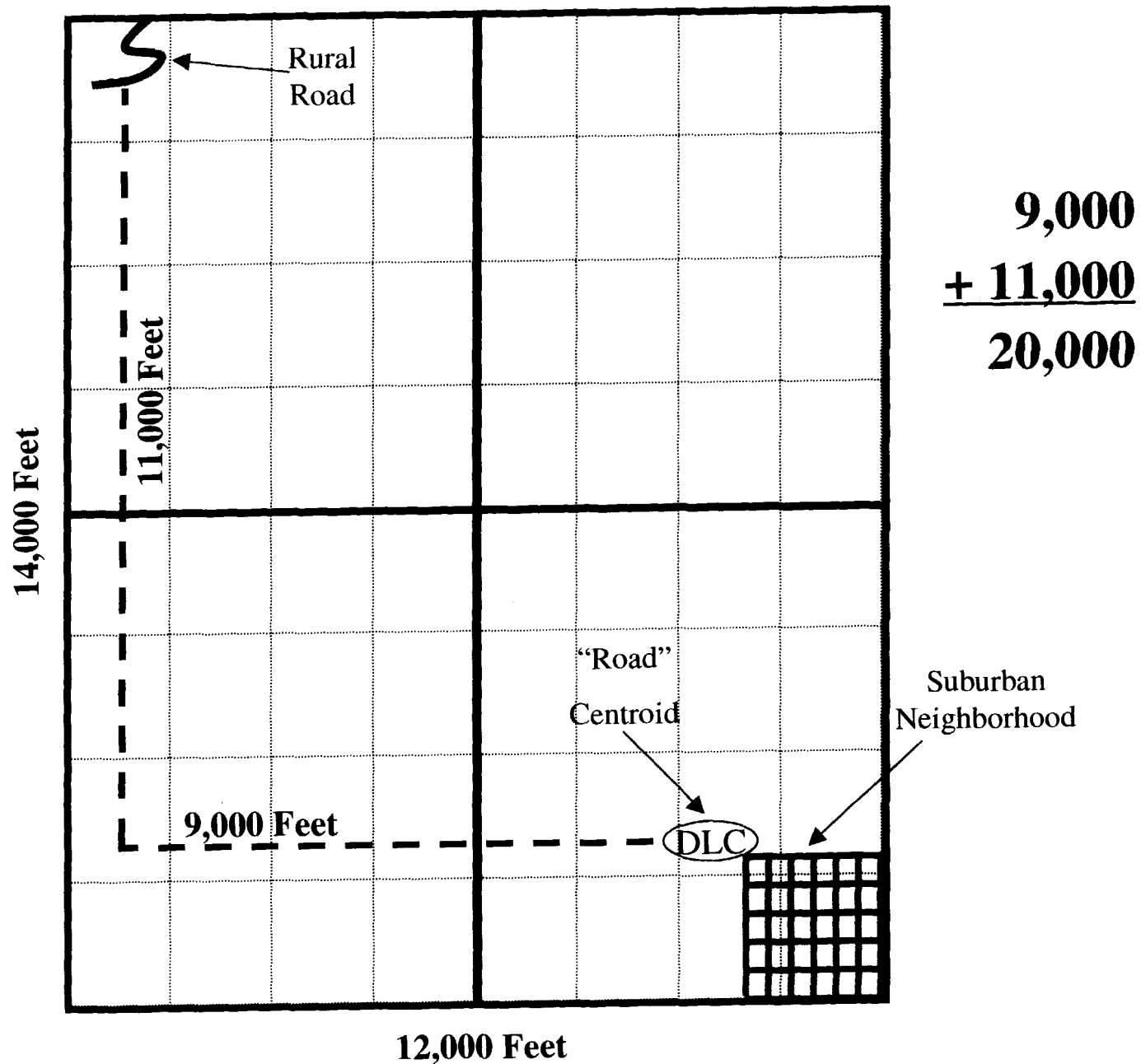
Figure 10

Illustration of BCPM 3 Macrogrid Sizes

7.26 Sq. Miles

6.53 Sq. Miles

5.16 Sq. Miles

TX PR

ND

AK
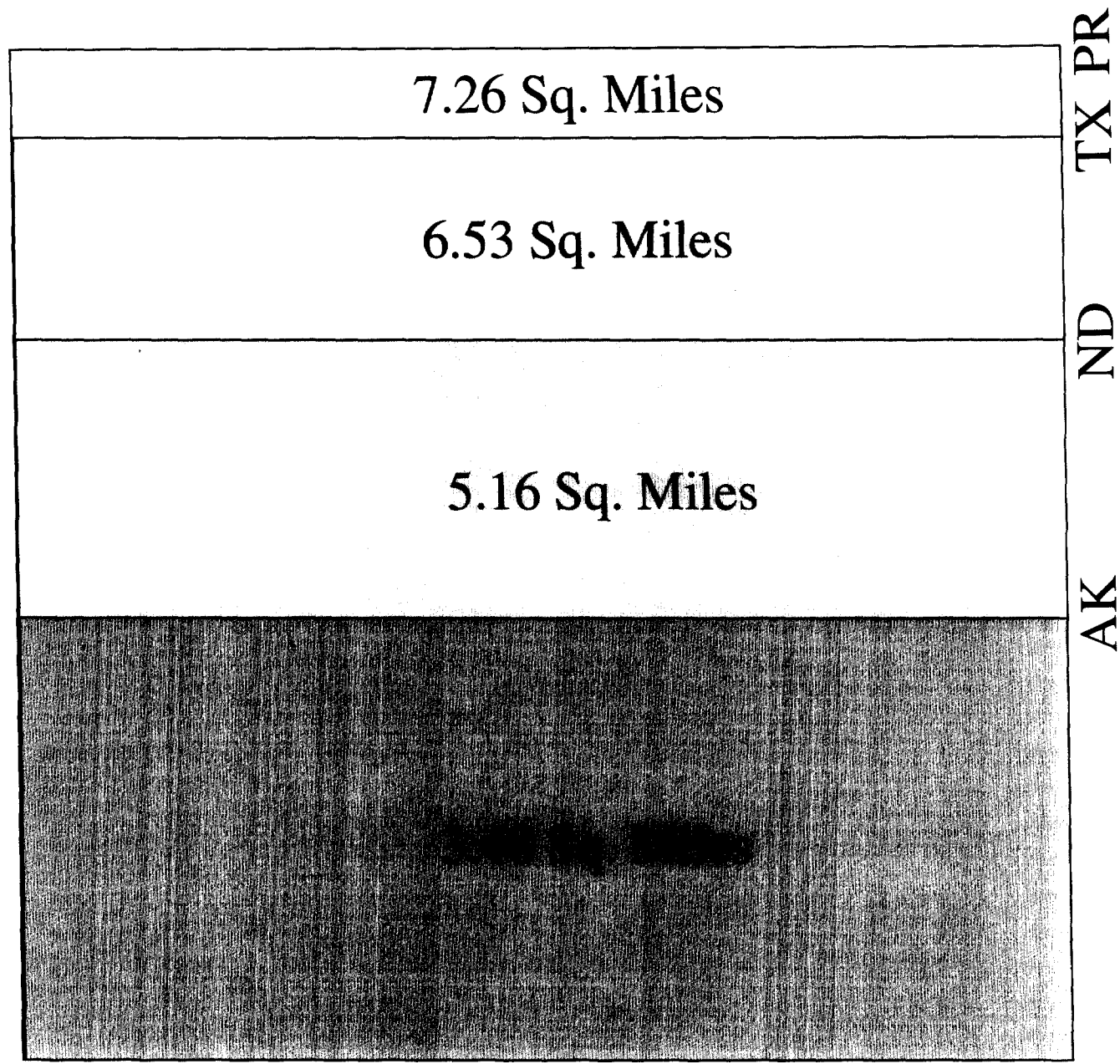
Figure 11

1 DLC
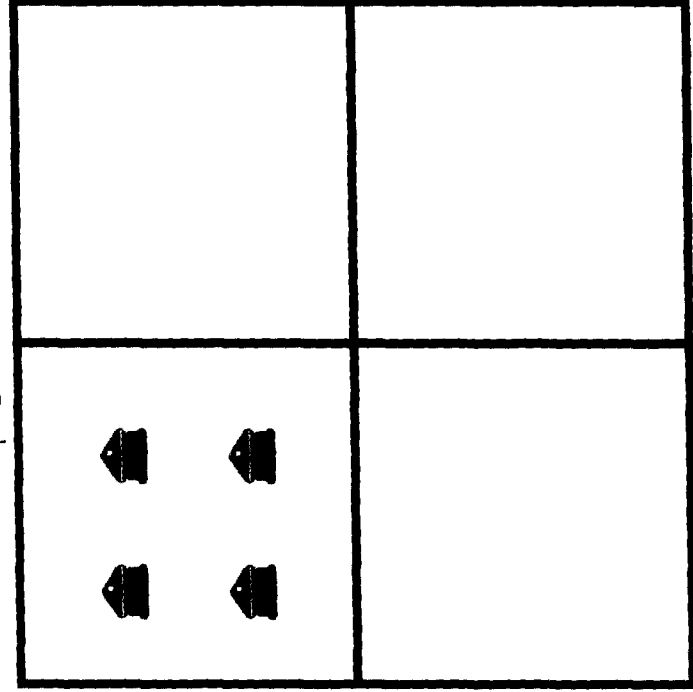
2 DLCs
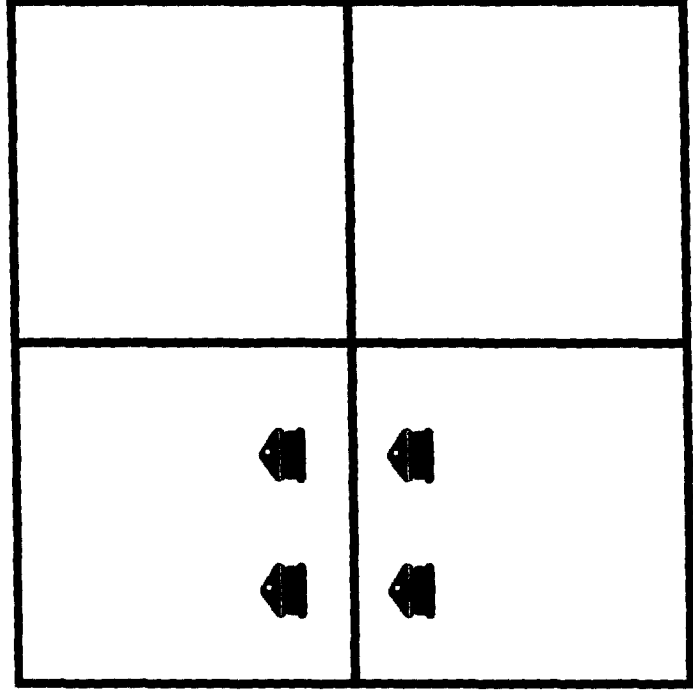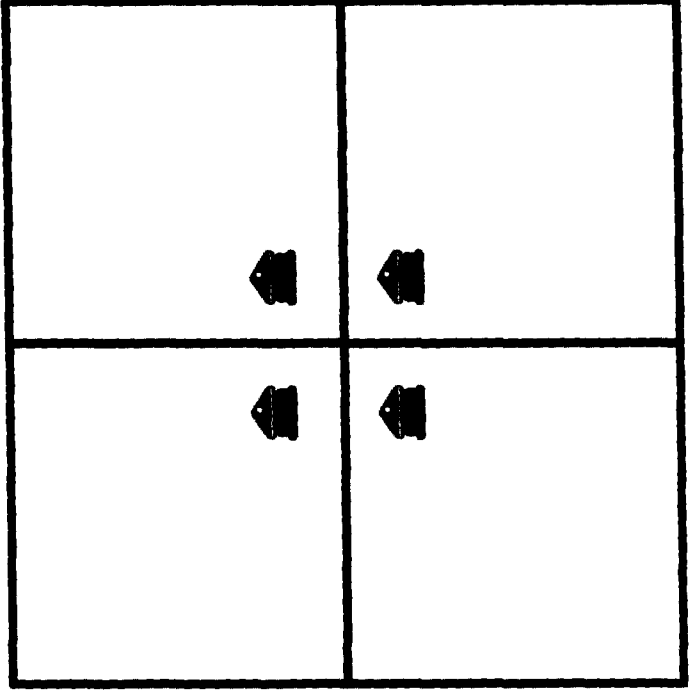
2 DLCs
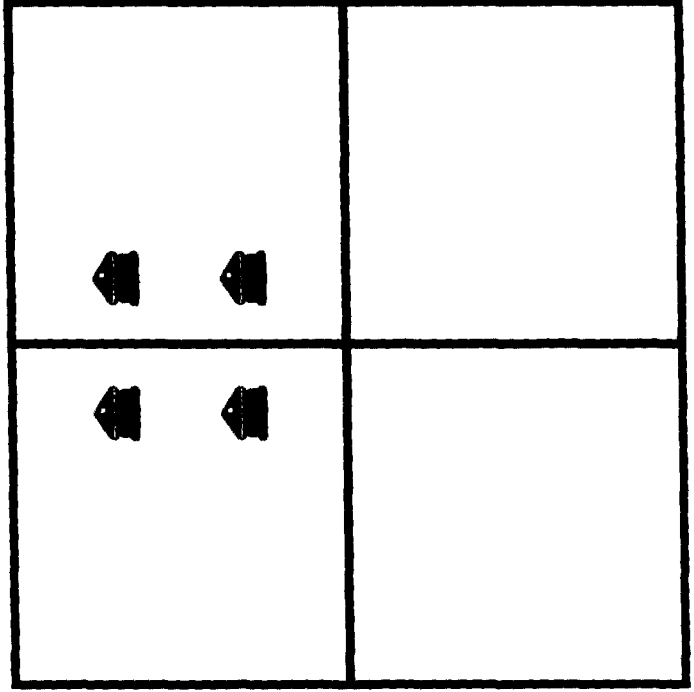
4 DLCs

$1/25^{o}$ meridians

Figure 12

**Waterford PA
Grid constrained clusters
WTFRPAXW**

**At max distance of 12K for
clustering with Grid size of
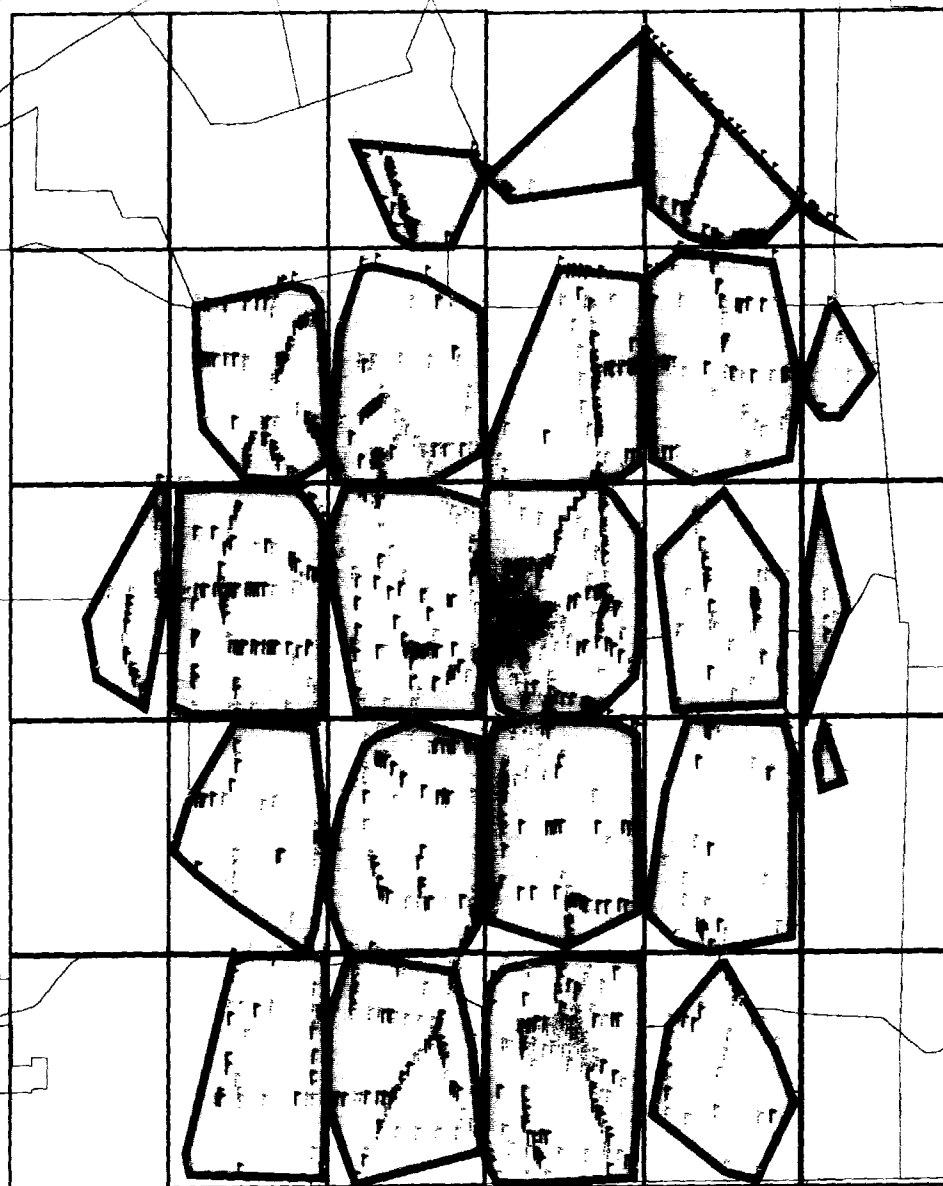1/25 of a degree**

24 Resulting
Main Clusters

Figure 13

**Waterford PA
Unconstrained Clusters
WTFRPAXW
At max distance of 12K for
clustering with no
grid constraints**
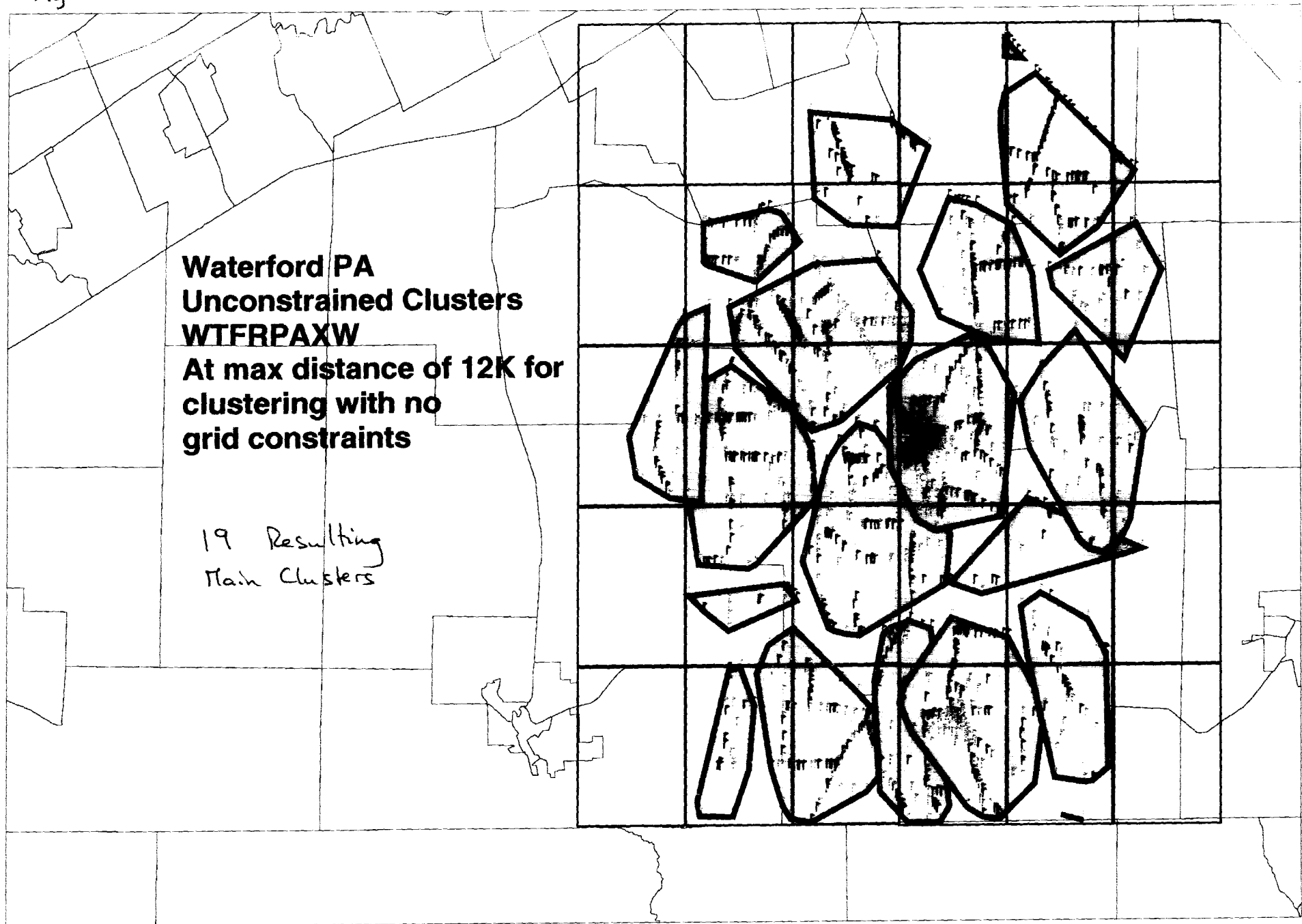
19 Resulting
Main Clusters

Figure 14

**Waterford PA
Grid constrained clusters
WTFRPAXW
At max distance of 18K for
clustering with Grid size of
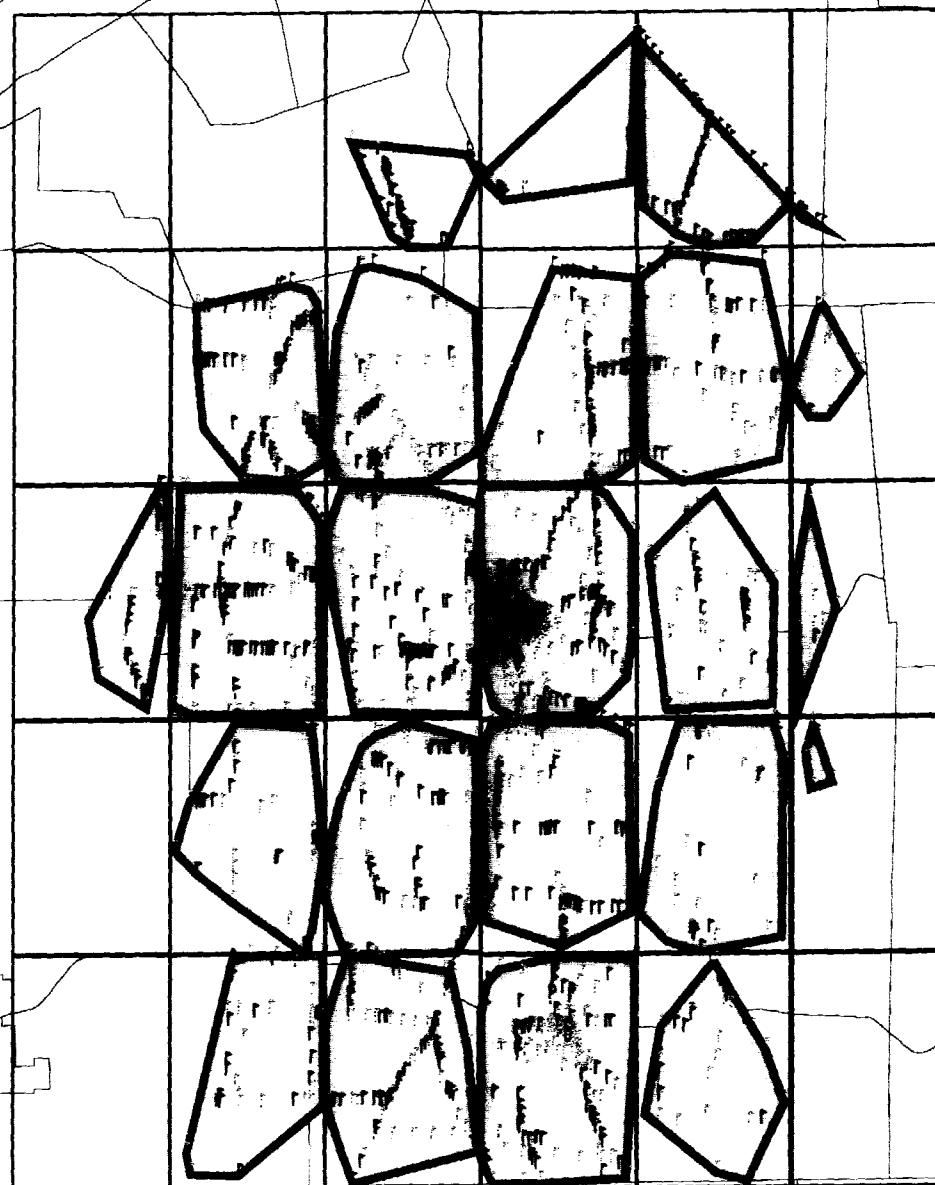1/25 of a degree**

24 Resulting
Mash Clusters

Figure 15

**Waterford PA
Unconstrained Clusters
WTFRPAXW
Max distance of 18K for
clustering with no
grid constraints**

10 Resulting
Main Clusters